# POLLUTION AND CAVES

## **Objectives:**

Students will:

- examine ways pollution on the surface can affect groundwater quality in karst areas
- identify point source and non-point source pollution.

### **Materials:**

• See "Build a Maze Cave" activity

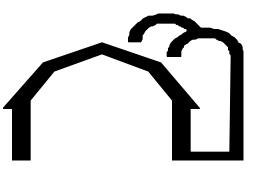


## **Background:**

Point source pollution has only one source of origin, such as an industrial plant or a sewage leak. This often releases concentrated pollutants into the environment. Non-point source pollution has a diffuse origin, such as rain or snow melt moving across and through the ground picking up natural and man-made pollutants. The pollutants are then deposited in lakes, rivers, oceans, or groundwater.

#### **Procedure:**

- 1. Define and discuss point source and non-point source pollution. Write the definitions on the board.
- 2. Ask the students to think about everything they have learned about caves, karst, and underground water movement. How do they think karst areas will be affected by point source and non-point source pollution?
- 3. Divide the students into small groups and have each group create a cave, as they did in the "Build a Maze Cave" activity.
- 4. An oil spill has occurred on the surface above their cave. What type of pollution is this? Have each group designate a spot on the surface of their cave as the spill site. Next, the students should trace the path of the oil as it makes its way toward the groundwater. How long did it take for the oil to contaminate the groundwater? (Use the time scale from the Build a Maze Cave activity).
- 5. Now, non-point source pollution is seeping into the ground above their cave after a heavy rain. It will enter the cave at all points. Have the students trace the pollution. How long does it take the fastest-moving pollution to reach the groundwater? The slowest?
- 6 Discuss the implications of point source and non-point source pollutants in the environment.
- 7 Which type is harder to clean up?
  - Which might cause the most devastating problems in the short-term?
  - In the long-term?
  - How might it affect our drinking water?
  - Why is pollution a major concern in karst areas?
  - Discuss the short travel time for pollution in caves.
  - Are pollutants filtered out as they travel through caves?



- 7. Define sinkholes. Imagine land with a sinkhole present.
  - Would the contaminants get into the cave faster?
  - Would this have any affect on the groundwater supply?
  - Could you use water from the cave to determine the origin of contaminants found underground?
  - What if there was a well being contaminated?
  - What could happen to the drinking water supply?
  - Could one well have an affect on others nearby?
  - How could you improve the quality of the well?
  - Would you have to dig another one, dig this one deeper, dig further from the contamination source?
  - How could a well casing help protect one well from contaminating another? (See Changing Groundwater Levels How Does a Well Work?)
  - Could a well help you determine where the contamination was coming from? Could a series of wells?
  - Would it be easier to detect point or non-point source pollution in a well?
  - How could you take steps to improve the water quality of a contaminated area?

